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CASE CLV-19623/A/CVE42

CLAIM AMENDMENTS

Please amend claims 1, 2, 5, 8-10, 13-23, 27-33, 35-37, 40, 42-43, 47-53, 56, 59, 72-73, 75 and 79 as follows:

1. (currently amended) A process for the manufacture of mouldings that are crosslinked in a mould at least to a degree sufficient to be released from the mold, comprising the steps of: introducing a starting crosslinkable material that is in a state in which it is at least partially uncrosslinked into the mould, wherein the mould ~~has a mould cavity determining the shape of the moulding to be produced and~~ is at least partially impermeable to an energy suitable to cause the crosslinking of the starting crosslinkable material and comprises a first mould half having a first mould surface and a second mould half having a second mould surface, wherein the first and second mould surfaces together define a mould cavity; providing the energy ~~causing the crosslinking;~~ and ~~impinging in a spatially restricting impingement of restricted manner the energy to the mould cavity in an energy-impinging region covering the center of the mould cavity and having causing the crosslinking upon all the portion of the crosslinkable material located in the mould cavity and limited by a non-adjustable peripheral boundary defined by the spatial restriction of the energy impingement, thereby causing essentially only the starting crosslinkable material disposed in the energy-impinging region of the mould cavity to be crosslinked all together so as to cause crosslinking of the portion of the crosslinkable material in the mould cavity to form the a moulding having a first surface, an opposite second surface and an edge, wherein the first surface is defined by the first mould surface, the second surface is defined by the second mould surface, and the edge contour of the moulding is defined by the non-adjustable peripheral boundary of the energy-impinging region defined determined substantially by the spatial restriction of the energy impingement, so that a~~ and wherein the produced moulding is produced free from burrs or flashes.
2. (currently amended) A process according to claim 1, wherein the spatial restriction of the energy impingement is effected by masking of the mould, the masking being at least partially impermeable to the energy ~~causing the crosslinking.~~
3. (previously amended) A process according to claim 1, wherein the energy employed to cause the crosslinking is radiation energy.
4. (original) A process according to claim 3, wherein the radiation energy is in the form of a substantially parallel beam.

5. (currently amended) A process according to claim 1, wherein the mould used is one that is highly permeable at least at one side to the energy ~~causing the crosslinking~~, and the spatial restriction of the energy impingement is effected by parts of the mould that are impermeable or of poor permeability to the energy ~~causing the crosslinking~~.

6. (canceled)

7. (canceled)

8. (currently amended) A process according to claim 1, wherein the mould is not fully closed after the introduction of the starting material into the mould cavity, so that at least a gap containing ~~uncrosslinked~~ excess starting material remains open, which gap is in communication with the mould cavity and preferably surrounds it, and wherein the energy ~~causing the crosslinking~~ is kept away from the excess starting material disposed in that gap.

9. (currently amended) A process according to claim 8, wherein the mould is closed further following crosslinking shrinkage as crosslinking of the starting crosslinkable material progresses.

10. (currently amended) A process according to claim 8, wherein a the starting crosslinkable material that is a flowable liquid ~~of at least viscous flowability prior to crosslinking~~ is used, and wherein a reservoir that is not impinged upon by the energy ~~causing the crosslinking~~ is provided from which the starting crosslinkable material can flow back through the gap into the mould cavity to compensate for shrinkage.

11. (original) A process according to claim 1, wherein, after the moulding has been released from the mould, any uncrosslinked or only partially crosslinked material adhering to the moulding is removed by washing with a suitable solvent.

12. (original) A process according to claim 1, wherein the mould is closed without force, so that the two mould halves lie against one another without external pressure.

13. (currently amended) A process according to claim 1, wherein the filling of the mould cavity is carried out with the mold at least partially immersed in the starting crosslinkable material that is at least partially still in the uncrosslinked state.

14. (currently amended) A process according to claim 13, wherein, for filling the mould cavity, the cavity is connected to a reservoir which surrounds it, in which the starting crosslinkable material is stored and from which the mould cavity is flooded.
15. (currently amended) A process according to ~~either~~ claim 13, wherein the mould is closed in the starting crosslinkable material.
16. (currently amended) A process according to claim 13, wherein a the mould is used that comprises a container and a mould member that is displaceable in that container and can be moved away from and towards the container wall lying opposite it for the purpose of opening and closing the mould, the starting crosslinkable material being fed in between the container wall and the mould member as the mould is opened and conveyed away again as the mould is closed.
17. (currently amended) A process according to claim 16, wherein ~~a mould having two mould halves is used in which~~ one of the first and second mould halves half is provided on the container wall and the other mould half is provided on the displaceable mould member.
18. (currently amended) A process according to claim 17, wherein ~~a mould having~~ the first mould half is a male mould half and the second mould half is a female mould half is used, the male mould half being provided on the container wall and the female mould half being provided on the displaceable mould member.
19. (currently amended) A process according to claim 16, wherein pumps are used to feed in and convey away the starting crosslinkable material.
20. (currently amended) A process according to claim 16, wherein the displaceable mould member is driven in order to feed in and convey away the starting crosslinkable material.
21. (currently amended) A process according to claim 13, wherein the crosslinked moulding can be released from the mould by flushing out the mould with the starting crosslinkable material.
22. (currently amended) A process according to claim 16, wherein the crosslinked moulding can be released from the mould by flushing out the mould with the starting crosslinkable material, and

wherein the moulding is separated from the mould by the flow of the starting crosslinkable material as the mould is opened and is flushed out of the mould by the flow of the starting crosslinkable material as the mould is closed.

23. (currently amended) A process according to claim 21, wherein in a first cycle the mould is opened and closed again, then at least the crosslinking necessary for it to be possible for the moulding to be released from the mould is effected by the impingement of energy and, in a second cycle, the mould is opened again, the moulding being separated from the mould and the displaceable mould member then being moved back towards the opposite-lying container wall again in order to close the mould, in the course of which the crosslinked moulding is flushed out of the mould.

24. (original) A process according to claim 13, wherein the crosslinked moulding is removed from the mould by means of a gripping device.

25. (previously amended) A process according to claim 16, wherein the crosslinked moulding is removed from the mould by means of a gripping device, and wherein the moulding removed from the mould by the gripping device is deposited on the displaceable mould member outside the space between the displaceable mould member and the opposite-lying wall.

26. (original) A process according to claim 25, wherein the moulding deposited on the displaceable mould member is held fast thereto by negative pressure and then released from it by positive pressure.

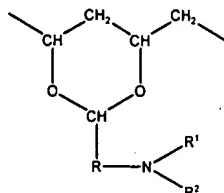
27. (currently amended) A process according to claim 13, wherein the mould is not fully closed after the introduction of the starting crosslinkable material into the mould cavity, so that an annular gap containing uncrosslinked excess starting crosslinkable material remains open, which gap surrounds the mould cavity and is in communication with that mould cavity.

28. (currently amended) A process according to claim 27, wherein the mould is closed further following crosslinking shrinkage as crosslinking of the starting crosslinkable material progresses.

29. (currently amended) A process according to claim 28, wherein a the starting crosslinkable material that is a flowable liquid ~~of at least viscous flowability prior to the crosslinking is used~~, and

wherein the excess starting crosslinkable material can flow back through the annular gap into the mould cavity to compensate for shrinkage.

30. (currently amended) A process according to claim 1, wherein the starting crosslinkable material is a prepolymer that is a derivative of a polyvinyl alcohol having a molecular weight of at least about 2000 that, based on the number of hydroxy groups of the polyvinyl alcohol, comprises from approximately 0.5 to approximately 80 % of units of formula I



(I)

wherein

R is lower alkylene having up to 8 carbon atoms,

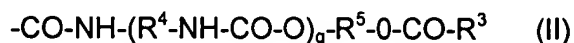
R¹ is hydrogen or lower alkyl and

R² is an olefinically unsaturated, electron-withdrawing, copolymerisable radical preferably having up to 25 carbon atoms.

31. (currently amended) A process according to claim 30, wherein the starting crosslinkable material is a prepolymer wherein R² is an olefinically unsaturated acyl radical of formula R³-CO-, in which R³ is an olefinically unsaturated copolymerisable radical having from 2 to 24 carbon atoms, preferably from 2 to 8 carbon atoms, especially preferably from 2 to 4 carbon atoms.

32. (currently amended) A process according to claim 31, wherein the starting crosslinkable material is a prepolymer wherein R³ is alkenyl having from 2 to 8 carbon atoms.

33. (currently amended) A process according to claim 30, wherein the starting crosslinkable material is a prepolymer wherein the radical R₂ is a radical of formula II



wherein

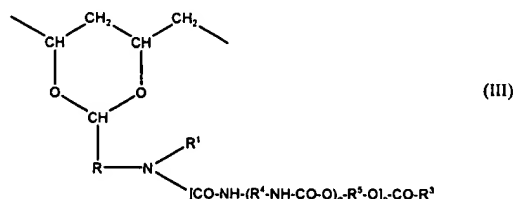
q is zero or one and

R⁴ and R⁵ are each independently lower alkylene having from 2 to 8 carbon atoms, arylene having from 6 to 12 carbon atoms, a saturated divalent cycloaliphatic group having from 6 to 10

carbon atoms, arylenealkylene or alkylenearylene having from 7 to 14 carbon atoms or arylenealkylenearylene having from 13 to 16 carbon atoms, and

R^3 is an olefinically unsaturated copolymerisable radical having from 2 to 24 carbon atoms, ~~preferably from 2 to 8 carbon atoms, especially preferably from 2 to 4 carbon atoms.~~

34. (original) A process according to claim 30 wherein the prepolymer is a derivative of a polyvinyl alcohol having a molecular weight of at least about 2000 that, based on the number of hydroxy groups of the polyvinyl alcohol, comprises from approximately 0.5 to approximately 80 % of units of formula III



wherein

R is lower alkylene,

R^1 is hydrogen or lower alkyl,

p is zero or one,

q is zero or one,

R^3 is an olefinically unsaturated copolymerisable radical having from 2 to 8 carbon atoms and

R^4 and R^5 are each independently lower alkylene having from 2 to 8 carbon atoms, arylene having from 6 to 12 carbon atoms, a saturated divalent cycloaliphatic group having from 6 to 10 carbon atoms, arylenealkylene or alkylenearylene having from 7 to 14 carbon atoms or arylenealkylenearylene having from 13 to 16 carbon atoms.

35. (currently amended) A process according to claim 34, wherein the starting crosslinkable material is a prepolymer wherein

R is lower alkylene having up to 6 carbon atoms,

p is zero and

R^3 is alkenyl having from 2 to 8 carbon atoms.

36. (currently amended) A process according to claim 34, wherein the starting crosslinkable material is a prepolymer wherein

R is lower alkylene having up to 6 carbon atoms, p is one,

q is zero,

R⁵ is lower alkylene having from 2 to 6 carbon atoms and

R³ is alkenyl having from 2 to 8 carbon atoms.

37. (currently amended) A process according to claim 34, wherein the starting crosslinkable material is a prepolymer wherein R is lower alkylene having up to 6 carbon atoms,

p is one,

q is one,

R⁴ is lower alkylene having from 2 to 6 carbon atoms, phenylene, unsubstituted or substituted by lower alkyl, cyclohexylene or cyclohexylene-lower alkylene, unsubstituted or substituted by lower alkyl, phenylene-lower alkylene, lower alkylene-phenylene or phenylene-lower alkylene-phenylene,

R⁵ is lower alkylene having from 2 to 6 carbon atoms and

R³ is alkenyl having from 2 to 8 carbon atoms.

38. (original) A process according to claim 30, wherein the starting material is a prepolymer that is a derivative of a polyvinyl alcohol having a molecular weight of at least about 2000 that, based on the number of hydroxy groups of the polyvinyl alcohol, comprises from approximately 1 to approximately 15 % of units of formula I.

39. (original) A process according to claim 1, wherein one half of the mould is used as packaging for the contact lens.

40 (currently amended) A device for the manufacture of mouldings, comprising:

a closable and openable mould, wherein the mould comprises a first mould half having a first mould surface and a second mould half having a second mould surface, wherein the first and second mould surfaces together define a mould cavity which can be filled with a starting crosslinkable material ~~defining a mould cavity which is capable of determining the shape of a moulding to be produced therein~~, wherein the mould is at least partially permeable to an energy suitable to cause crosslinking of a crosslinkable material to be introduced into the mould;

a source providing energy suitable to cause crosslinking of the crosslinkable material;

means for causing spatially restricting impingement of the energy, in a spatially restricted manner, upon all the portion of the crosslinkable material located in the mould cavity and limited by to the mould cavity in an energy-impinging region covering the center of the mould cavity and having a non-adjustable peripheral boundary defined by the spatial restriction of the energy impingement, so as to cause crosslinking of the portion of the crosslinkable material in the mould

cavity thereby causing essentially only the starting crosslinkable material disposed in the energy-impinging region of the mould cavity to be crosslinked all together to form a moulding having a first surface, an opposite second surface and an edge, wherein the first surface is defined by the first mould surface, the second surface is defined by the second mould surface, and the edge contour of the moulding is defined by the non-adjustable peripheral boundary of the energy-impinging region defined ~~determined~~ substantially by the spatial restriction of the energy impingement, so that a and wherein the produced moulding is ~~produced~~ free from burrs or flashes.

41. (canceled)

42. (currently amended) A device according to claim ~~40~~41, wherein the ~~mould comprises two~~ first and second mould halves ~~which~~ are separated along a separating face, and wherein the mask is arranged outside the mould cavity on one of the two mould halves and/or on both mould halves in the region of the separating face.

43. (currently amended) A device according to claim 42, wherein the source generates UV radiation and wherein at least one of the two mould halves of the mould consists of UV-permeable material.

44. (previously amended) A device of claim 43, wherein the mask consists of a layer of material that is impermeable to UV radiation.

45. (original) A device according to claim 40, wherein the mould is provided with spacers which hold the two mould halves a small distance apart from one another when the mould is in the closed position, so that at least a gap is formed that preferably surrounds the mould cavity and is in communication with that cavity, and wherein the mask is arranged in the region of the gap.

46. (original) A device according to claim 45, wherein the mould is provided with resilient means or displacement means that allow the two mould halves to move closer together following crosslinking shrinkage.

47. (currently amended) A device according to claim 40, wherein during filling of the mould cavity the mould is at least partially immersed in starting crosslinkable material that is at least partially still in the uncrosslinked state.

48. (currently amended) A device according to claim 47 which comprises a reservoir for supplying the starting crosslinkable material, which reservoir surrounds the mould cavity and can be connected to the mould cavity, and wherein during filling of the mould cavity the reservoir is connected to the mould cavity and floods that cavity.

49. (currently amended) A device according to claim 47, which comprises means for closing the mould while the mould is at least partially immersed in the starting crosslinkable material.

50. (currently amended) A device according to claim 47, wherein the mould comprises a container and a displaceable mould member ~~displaceable in that container, which~~ wherein the displaceable mould member can be moved away from and towards the container wall lying opposite it for the purpose of opening and closing the mould, and wherein there is provided in the container an inlet through which the starting crosslinkable material flows in between the container wall and the displaceable mould member as the mould is opened, and wherein there is provided in the container an outlet through which the starting crosslinkable material flows out again as the mould is closed.

51. (currently amended) A device according to claim 50, wherein one of the mould ~~comprises two~~ halves, one mould half being is provided on the container wall and the other on the displaceable mould member.

52. (currently amended) A device according to claim 51, wherein the first mould half ~~is~~ comprises a male mould half and the second mould half is a female mould half, and wherein the male mould half is provided on the container wall and the female mould half is provided on the displaceable mould member.

53. (currently amended) A device according to claim 50, wherein pumps are provided which, as the mould is opened, feed in the starting crosslinkable material through the inlet and between the container wall and the displaceable mould member and, as the mould is closed, convey it back through the outlet.

54. (original) A device according to claim 50, wherein means are provided for driving the displaceable mould member.

55. (original) A device according to claim 47, wherein means are provided for producing a flow that separates the moulding from the mould when the mould is opened and flushes the moulding out of the mould when the mould is closed.

56. (currently amended) A device according to claim 50, wherein means are provided for producing a flow that separates the moulding from the mould when the mould is opened and flushes the moulding out of the mould when the mould is closed, and wherein, in a first cycle, the starting crosslinkable material first of all flows in through the inlet and between the container wall and the displaceable mould member and then flows back out through the outlet, the source for the energy then acts upon the mould with an amount of energy necessary for it to be possible for forming the moulding to be released from the mould, and then, in a second cycle, the starting crosslinkable material flows in through the inlet and between the container wall and the displaceable mould member separates the moulding from the mould and then flushes it out through the outlet.

57. (original) A device according to claim 47, wherein a gripping device is provided which removes the crosslinked moulding from the mould.

58. (previously amended) A device according to claim 50, wherein a gripping device is provided which removes the crosslinked moulding from the mould, and wherein the container comprises, on a container wall other than the shape-giving face, a hollow or recess that extends substantially in the direction of movement of the displaceable mould member, the gripping device being arranged in that hollow or recess, and wherein the displaceable mould member comprises, on an outer wall that does not lie opposite the shape-giving container wall, an indentation in which the gripping device deposits the removed moulding.

59. (currently amended) A device according to claim 58, wherein the displaceable mould member comprises a channel that leads to the indentation and can be connected to a negative pressure or positive pressure source, which channel is connected to the negative pressure source when the gripping device deposits the removed moulding in the indentation of the displaceable mould member and then is connected to the positive pressure source in order to release the lens.

60. (original) A device according to claim 51, wherein the mould is provided with spacers that hold the two mould halves a small distance apart from one another when the mould is in the closed

position, so that an annular gap is formed that surrounds the mould cavity and is in communication with that cavity.

61. (original) A device according to claim 60, wherein the mould is provided with resilient means or displacement means that allow the two mould halves to move closer together following crosslinking shrinkage.

62. (canceled)

63. (previously added) A process of claim 1, wherein said molding is an optical lens.

64. (previously added) A process of claim 1, wherein said molding is a contact lens.

65. (previously added) A process of claim 3, wherein the radiation energy is UV radiation.

66. (previously added) A process of claim 3, wherein the radiation energy is gamma radiation.

67. (previously added) A process of claim 3, wherein the radiation energy is electron radiation.

68. (previously added) A process of claim 3, wherein the radiation energy is thermal radiation.

69. (previously added) A process of claim 4, wherein the masking is effected by a mask that is impermeable or of poor permeability to the crosslinking energy and wherein the mask is provided on or in the mould but outside the mould cavity.

70. (previously added) A process of claim 69, wherein the mould comprises different mould members and the mask is arranged in the region of separating planes or separating faces of different mould members.

71. (previously added) A process of claim 70, wherein the mask is provided on the separating face of one of the mould members.

72. (currently amended) A process of claim 70, wherein the mask is arranged such that it is in contact with the starting crosslinkable material.

73. (currently amended) A process according to claim 71, wherein the mould is not fully closed after the introduction of the starting crosslinkable material into the mould cavity, so that at least a gap containing ~~uncrosslinkable~~ excess starting crosslinkable material remains open, the gap being in communication with the mould cavity, and wherein the crosslinking energy is restricted from the excess starting crosslinkable material disposed in the gap by means of a mask.

74. (previously added) A process of claim 73, wherein the mould is closed further following crosslinking shrinkage as crosslinkage of the material progresses.

75. (currently amended) A device of claim 40, wherein the means for causing spatially restricting the impingement of the energy comprises a mask provided on the mould, the mask being impermeable or of poor permeability to the energy causing the crosslinking.

76. (previously added) A device of claim 43, wherein the UV-permeable material is quartz.

77. (previously added) A device of claim 44, wherein the layer is a metal oxide layer.

78. (previously added) A device of claim 77, wherein the layer is a chrome layer.

79. (currently amended) A process for the manufacture of a crosslinked moldings, comprising the steps of:

(a) introducing a starting crosslinkable material into a mold, wherein said mold is at least partially impermeable to a crosslinking energy suitable to crosslink the starting crosslinkable material and ~~has a mold cavity determining the shape of the molding to be produced~~ comprises a first mold half having a first molding surface and a second mold half having a second molding surface, wherein the first and second molding surfaces together define a mold cavity;

(b) providing the crosslinking energy; and

(c) ~~causing spatially restricting~~ the crosslinking energy to be impinged, ~~in a spatially restricted manner and in an amount sufficient, upon all the portion of the crosslinkable material located in the mold cavity and limited by~~ to the mold cavity in an energy-impinging region corresponding to a molding to be produced and having a non-adjustable peripheral boundary defined by the spatial restriction of the crossing energy impingement, thereby causing essentially only the starting crosslinkable material disposed in the energy-impinging region of the mold cavity to be crosslinked all together ~~to crosslink the portion of the crosslinkable material in the mold cavity~~ to a degree sufficient to form the molding capable of being released from said mold, wherein the produced